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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,176	09/24/2003	Tatsunhide Tsuyuki	Q77300	4041
23373 7590 07/19/2007 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			EXAMINER HUNG, YUBIN	
			ART UNIT 2624	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/668,176	TSUYUKI ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5 and 7-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5, 7-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>20070711</u> . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____. |

Response to Amendment/Arguments

1. This action is in response to amendment filed 05/14/07, which has been entered.
2. Claims 4 and 6 have been cancelled and 15-19 added; currently claims 1-3, 5 and 7-19 are still pending.
3. In view of Applicant's amendment, the objection to the specification has been withdrawn.
4. In view of Applicant's amendment, the 35 USC § 112 rejections have been withdrawn.
5. Applicant's amendment has rendered moot the 35 USC § 101 rejection of claim 14.
6. Applicant's arguments on pp. 8-11 regarding the 35 USC § 102 and 103 rejections have been fully considered but they are not persuasive; see below.
7. **In remarks Applicant argued in substance:**

- A. *(Re claim 1) that Matsui fails to disclose that the brightness is a result of reducing a difference corresponding to the parallax of both eyes due to the relative proximity of the left and right eyes of a human being (P. 9, 2nd paragraph)*

However, this argument is not persuasive because first, the use of human eyes is not a claim limitation and in stereoscopy the left and the right imagers can be considered as the left and the right eyes. Second, as recited in claim 1, "corresponding to the parallax of both eyes" refers to a geometric difference between image structures, not the difference other than a geometric difference. Third, irrespective of the length of the parallax, to acquire a left/right image pair, one either has to use a pair of imagers to acquire the pair either at the same time or at different times; or a single imager to capture both images at different times. The spatial and/or temporal differences in image acquisition, a direct result of the parallax, can give rise to non-geometric differences such as the difference in pixel intensity (of corresponding pixel pairs in the two images) because of the characteristics of the imaging elements (e.g., CCD), among other things; this point is also made in the paragraph that begins at the bottom of page 4 of the specification of the instance application.

- B. *(Re claim 1) that the instant invention does not synthesize pairs of images into single images as Matsui does (P. 10, 1st paragraph)*

However, this argument is not persuasive because this feature of Matsui is not relied upon in the rejection. Moreover, images from the left and the right cameras have not been combined before the lightness correction [see Figs. 17B and 18].

- C. *(Re claim 3) that in the instant invention, an average noise is determined from the pair of images, and the average noise is used to correct both of the pair of images (P. 10, last 3 lines)*

However, this argument is not persuasive because what is recited above is not a limitation of claim 3; rather, it is a limitation of new claim 15, as Applicant indicates in the last line of P. 10. Regardless, a new ground of rejection is made in view of Rashkovskiy et al. (US 6,563,536); see below.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claim 1, 2, 5, 7, 8, 12-15 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsui et al. (US 2003/0128273).

10. Regarding claim 1 (as interpreted, see the attached interview summary), and similarly claims 13, 15 and 19, Matsui discloses an image processing apparatus [Fig. 16, ref. 1-8; P. 6, paragraph 123] comprising a processing unit [Fig. 16, ref. 1-9; P. 6, paragraph 123] which, in a pair of images formed to generate a difference corresponding to a parallax of both eyes [Fig. 17A, refs. 2-4 & 2-5; Fig. 17B, refs. 2-7 and 2-8; P. 5, paragraph 115, lines 5-6 (indicating that the images are for the left and the right eyes and therefore are according to the parallax of both eyes)], performs a process of reducing a difference of at least one of the pair of images other than a geometric difference between image structures corresponding to the parallax of both eyes [Fig. 17B, refs. 2-7 through 2-10 and Fig. 18, ref. S304 (lightness correction); P. 7, paragraph 139, lines 15-23; note that by making the intensity of corresponding portions

similar, the intensity difference, which is not geometric, is reduced]. (Note that regarding claims 15 and 19, per agreed-upon interpretation recited in the attached interview summary and paragraph 7.A of this Office action above, the lightness difference between the image pair that Matsui's invention corrects (see the analysis above for claim 1) is considered a difference between image structures that is not geometric.)

11. Regarding claim 2, Matsui further discloses that the pair of images is still images from a pair of video images [Fig. 16, refs. 1-1 & 1-4 and Fig. 17A, refs. 2-1 & 2-2 (capturing stereo video images); Fig. 17A, refs. 2-3 & 2-4 (still stereo image pair); P. 6, paragraphs 118, 127 and 128] formed to generate a difference corresponding to a parallax of both eyes [P. 5, paragraph 115, lines 5-6 (indicating that the images are for the left and the right eyes and therefore are according to the parallax of both eyes); note that a stereo pair of images inherently has a difference corresponding to a parallax].

12. Regarding claim 5, Matsui further discloses that the non-geometric difference is a color difference [P. 8, paragraph 157].

13. Regarding claim 7, Matsui further discloses

- a recognition unit which recognizes the geometric difference between image structures corresponding to the parallax of both eyes in the pair of images [Fig. 16, ref. 1-9; Fig. 18, ref. S303 (the largest cross correlation indicates the geometric difference). Note that per P. 6, paragraph 123, the CPU 1-9 executes applications and since it is the only unit capable of doing so (among the components of the apparatus 1-8), the application

- as the one specified in S303 of Fig. 18 necessarily has to be executed by the CPU and therefore it also serves as the recognition unit]
- wherein the processing unit performs a process of reducing a difference other than the geometric difference between the image structures recognized by the recognition unit in the pair of images [Per the analysis of claim 1; see especially Fig. 18, refs. S303 and S304]

14. Regarding claim 8, Matsui further discloses that the geometric difference is recognized by performing matching [Fig. 18, ref. S303, note that cross correlation is a form of matching].

15. Regarding claim 12, Matsui further discloses obtaining the pair of images of the same scene by using (1) more than one or (2) only one image pickup device [Fig. 16, refs. 1-1 & 1-4; Fig. 17A, refs. 2-1 & 2-2 (using two devices); P. 5, paragraph 115, lines 5-6 (indicating that the images are for the left and the right eyes and therefore are according to the parallax of both eyes)]

16. Claim 14, which is the corresponding medium claim of claims 1 (apparatus) and 13 (method), is rejected because per the analysis of claims 1 and 13 Matsui discloses the difference reduction process recited in the claim 14 and further discloses a storage medium for storing applications [Fig. 16, ref. 1-10 and P. 6, paragraph 123; see also P. 11, claim 32].

Claim Rejections - 35 USC § 103

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claims 3, 9, 11 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui et al. (US 2003/0128273) as applied to claims 1, 2, 5, 7, 8, 12-15 and 19 above, and further in view of Rashkovskiy et al. (US 6,563,536).

19. Regarding claim 3, and similarly claim 17, Matsui discloses all limitations of its parent, claim 1 (respectively, claim 13).

Matsui does not expressly disclose that the other difference is a difference between noise components superposed on the pair of images. However, Rashkovskiy discloses removing noise from images [Fig. 2, ref. 28; Fig. 3, ref. 24; Col. 3, lines 12-15. Note that the noise frame (i.e., noise component) is a good estimate of superimposed noise of a video frame. Note further that with dark current noise removed from images, the difference attributable to noise components is reduced].

Matsui and Rashkovskiy are combinable because they both have aspects that are from the same field of endeavor of image enhancement.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify Matsui with the teachings of Rashkovskiy by reducing the noise difference. The motivation would have been to improve image quality by removing noise caused by dark current, as Rashkovskiy indicates in Col. 1, lines 28-31.

Therefore it would have been obvious to combine Rashkovskiy with Mitsui to obtain the invention as specified in claim 3.

20. Regarding claim 9, Matsui further discloses that the processing unit performs, as the process of reducing the difference other than the geometric difference between the image structures

- at least one of a process of removing a noise component superposed on only one of the pair of images from the one image or a process of correcting at least one of the pair of images to eliminate or reduce a difference between noise components which are different from each other and superposed on corresponding regions on the pair of images [Matsui: Fig. 18, ref. S304; P. 7, paragraph 139, lines 18-23 (correction applied to one or both images). Note that Onda has already disclosed that the difference to be reduced is the noise component difference.]

21. Regarding claim 11, and similarly claims 16 and 18, Matsui further discloses applying correction to at least one of the pair of images [P. 7, paragraph 139, lines 21-23] and Rashkovskiy further discloses using the average of noise components as the correction amount [Figs. 3-8 & 13; Col. 3, line 55-Col. 4, line 3]

22. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsui et al. (US 2003/0128273) as applied to claims 1, 2, 5, 7, 8, 12-15 and 19 above, and further in view of Aucsmith et al. (US 6,873,723) and Rashkovskiy et al. (US 6,563,536).

Regarding claim 10, Matsui discloses all limitations of its parent, claim 7.

Matsui does not expressly, but Aucsmith does, disclose that the processing unit

- divides the pair of images into sectional regions
[Fig. 5 (regions); Fig. 7, ref. 720 (dividing); Col. 5, line 62-Col. 6, line 10; Col. 6, lines 62-64]
- determines a sectional region of the other image corresponding to a specific sectional region in the one image based on the geometric difference between image structures in the pair of images recognized by the recognition unit
[Fig. 7, ref. 730 (matching, i.e., determining corresponding region) . Col. 6, line 64-Col. 7, line 2]

Matsui and Aucsmith are combinable because they all have aspects that are from the same field of endeavor of stereoscopy.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify Matsui with the teachings of Aucsmith by dividing the images into regions and determining correspondence between regions from different images. The motivation would have been to establish the correspondence between the left and the right images so the depth of regions can be computed [Aucsmith: Col. 4, lines 10-13] and that the foreground and background can be separated [Aucsmith: Col. 1, lines 21-35].

Regarding the last limitation of claim 10

- compares the sectional regions determined to be corresponding regions with each other for the respective sectional regions, so that a noise component which causes the difference other than the geometric difference between the image structures

Note that Matsui further discloses that to reduce a difference (e.g., lightness), the component (i.e., the correction amount) that causes that difference is first determined by comparing the corresponding regions [Fig. 18, ref. S304 and P. 7, paragraph 139, lines 15-23].

The combined invention of Matsui and Aucsmith does not expressly disclose that the component to be determined is a noise component.

However, Rashkovskiy discloses removing noise from images [Fig. 2, ref. 28; Fig. 3, ref. 24; Col. 3, lines 12-15. Note that the noise frame (i.e., noise component) is a good estimate of superimposed noise of a video frame. Note further that with dark current noise removed from images, the difference attributable to noise components is reduced].

The combined invention of Matsui and Aucsmith is combinable with Rashkovskiy because they both have aspects that are from the same field of endeavor of image enhancement.

At the time of the invention it would have been obvious to one of ordinary skill in the art to modify the combined invention of Matsui and Aucsmith with the teachings of Rashkovskiy by having noise as the component of which the difference should be determined and reduced. The motivation would have been to improve image quality by removing noise caused by dark current, as Rashkovskiy indicates in Col. 1, lines 28-31.

Therefore it would have been obvious to combine Rashkovskiy with Mitsui and Aucsmith to obtain the invention as specified in claim 10.

Conclusion and Contact Information


23. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

24. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C. Bella can be reached on (571) 272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


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